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Forest Insect and Disease Management

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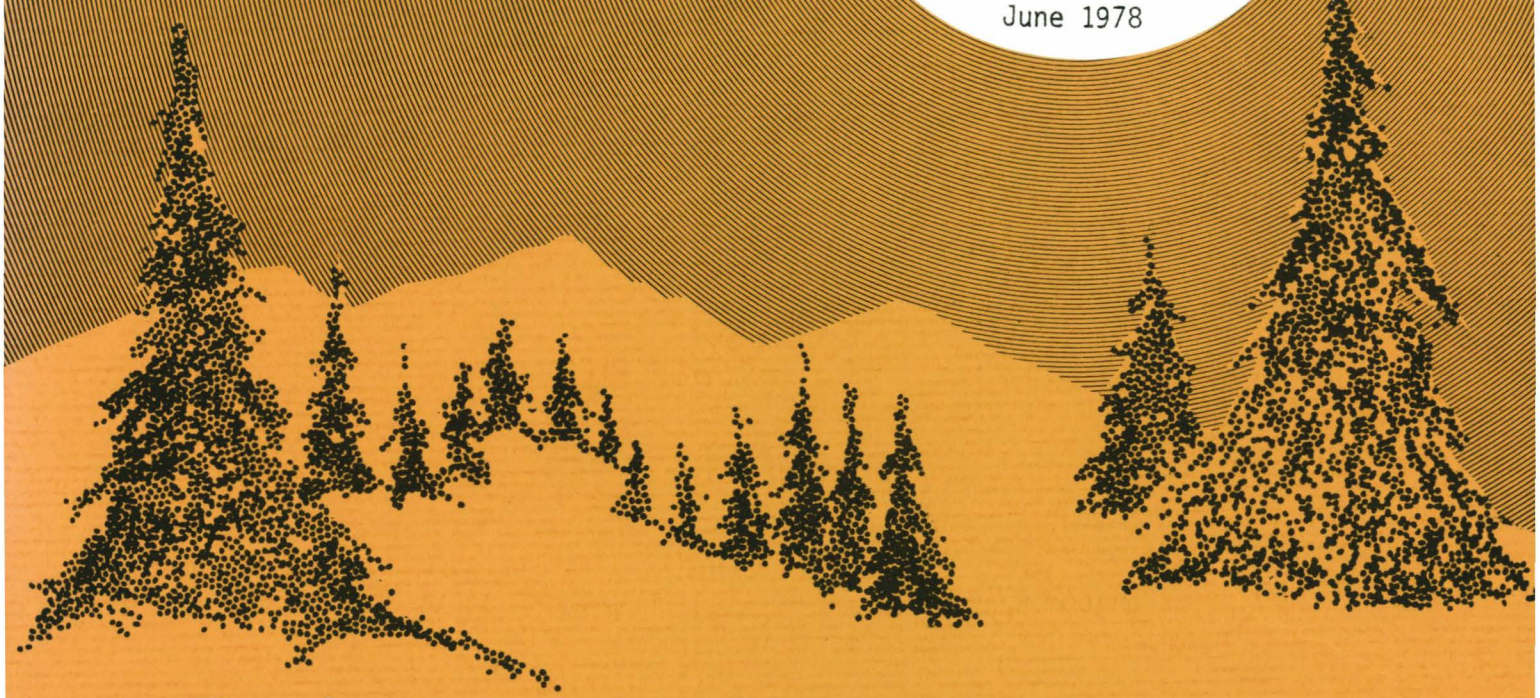
BIOLOGICAL
EVALUATION R2-78-1

MOUNTAIN PINE BEETLE

Bighorn National Forest
and Adjacent BLM,
State and Private Lands

Wyoming

June 1978



Rocky Mountain Region

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INTRODUCTION

The mountain pine beetle (MPB) continues to cause ponderosa pine mortality along the Bighorn Front Range on National Forest, BLM, Wyoming State and private lands.

On June 5-7, 1978, Vernon Creasap, Entomologist, and Kent Eggleston, Biological Technician, conducted a brood survey of four areas infested with MPB. Knight's (1960) sequential sampling plan [1/] was used to make population trend predictions for 1978. The four samples showed that the population is increasing.

TECHNICAL INFORMATION

CAUSAL AGENT: *Dendroctonus ponderosae* Hopkins, mountain pine beetle

HOST: *Pinus ponderosa* Laws., ponderosa pine

EXTENT OF INFESTATION: The infestation is located along the eastern slopes of the Bighorn Mountains, on National Forest, BLM, Wyoming State and private lands. Mortality occurs in scattered small groups of from 5 to 10 trees to larger groups of 200 or more trees.

LIFE HISTORY: The mountain pine beetle has one generation per year. Adults attack trees from mid-July through early September by boring through the bark to the cambium, then tunnel upward for 12 to 30 inches (these tunnels are called egg galleries). The females lay eggs in individual niches along each side of the gallery which is then packed with frass. After hatching, the larvae feed in individual channels (larval galleries) at right angles to the egg gallery, in the phloem. The insect overwinters in the larval stage. In the spring, when the larvae are fully developed they excavate an oval chamber (pupal chamber) at the end of the larval gallery and pupate. Finally mature adults emerge

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1/ KNIGHT, F. B. 1960. Sequential sampling of Black Hills beetle populations. USDA For. Serv. Rocky Mtn. For. and Range Exp. Sta. Res. Note #48, 8 pp.

from these pupal chambers by boring through the outer bark surface and fly to attack new trees, completing the generation.

METHODS

Utilizing Knight's (1960) sequential sampling plan, two 6-by-6 inch bark samples were taken at dbh on opposite sides of currently infested ponderosa pine trees. Samples were taken at 4 sites; Mosier Gulch, Piney Creek, Red Grade Spring, and Crystal Spring Draw. The Mosier Gulch sample was taken on BLM land. The Red Grade Spring sample was taken along the boundary of Wyoming State and BLM land. The other two samples were taken on National Forest lands.

RESULTS AND DISCUSSION

All four samples showed an increasing population trend for 1978. There was some interspecific competition with other inner bark feeding insects. Wood borers, *Buprestidae*, were found at all locations, although their numbers did not appear to be as great as in 1977. Another species of *Scolytidae* was found in association with MPB. The identification of this species has not been confirmed,* but it appears to be a species of *Hylurgops*. *Hylurgops* sp. is a secondary insect which usually attacks recently killed trees.

Greater losses from MPB may be expected in 1978 than in 1977.

Several areas of snow damage were observed. Damage varied from scattered trees with broken branches to areas where numerous trees had been uprooted or broken off in mid-bole. An aerial survey is needed to determine whether or not damage is extensive enough to present a future Ips problem. Ips engraver beetles have infested the snow damaged trees.

ALTERNATIVES

Alternative 1: Silvicultural treatment of all operable stands to reduce growing stock levels to 80 or 90. This will effectively

* *Hylurgops subcostulatus* Mann. - confirmation received after final draft approval.

reduce susceptibility of stands to MPB attack for periods of 20 years or more. Uneven age stand management often requires partial cutting in stands every 20 years. Therefore, reducing growing stock levels to 80 to 90, with the expected protection of the stand from beetle attack for 20 years or more, is compatible with current timber management techniques.

Alternative 2: Salvage infested timber would remove dead or dying trees so that some product would be realized. This action would not reduce the susceptibility of the stands to MPB attack. Salvage logging alone is only a temporary measure to reduce beetle populations and cannot be expected to give protection to a stand for more than 3 or 4 years.

Alternative 3: Doing nothing to alleviate the build-up of MPB attack on ponderosa pine forests cannot generally be justified from timber management or recreation management points of view. The MPB in epidemic proportions, may reduce growing stock below satisfactory levels for timber management. Dead trees will also increase fire hazard for a few years. During very high or extreme fire danger, forests may have to be closed to the public during periods of high recreational use because of the low fuel moisture content of fuels. Fire may further reduce timber inventory.

Alternative 4: Direct control by chemical treatment or burning of infested timber is another alternative. Silviculturally or biologically, direct control cannot be justified. Direct control is only a temporary course of action which will not protect a stand from beetle attack for more than 3 or 4 years. Furthermore, the treated trees are not utilized and no return is realized on the high investment needed for direct control.

Alternative 5: Preventative sprays may be used to protect high value trees, such as in campgrounds, or around private dwellings or businesses. This Alternative may be used in combination with one or more of the other Alternatives.

RECOMMENDATIONS

The first alternative listed, silvicultural treatment of stands, is recommended as the primary tool for reducing future losses to MPB. Alternative 2 should only be used when an area is scheduled

to receive silivcultural treatment within the next 3 or 4 years. Alternative 3 should only be used where stands are inaccessible or where a choice of alternatives does not exist. At the present time, alternative 4 is not recommended for general use. Land managers should complete a benefit/cost analysis to determine which alternative to use. Direct control or preventive spraying may be justified where high value trees are threatened, such as around campgrounds or near private homes or businesses. Preventative sprays for bark beetle control are Clean Crop; Pine Tree and Ornamental Spray, formulated by Balcom Chemical, Greeley, Colorado and some formulations of Lindane.

BIGHORN NATIONAL FOREST
1978 MPB BROOD SURVEY

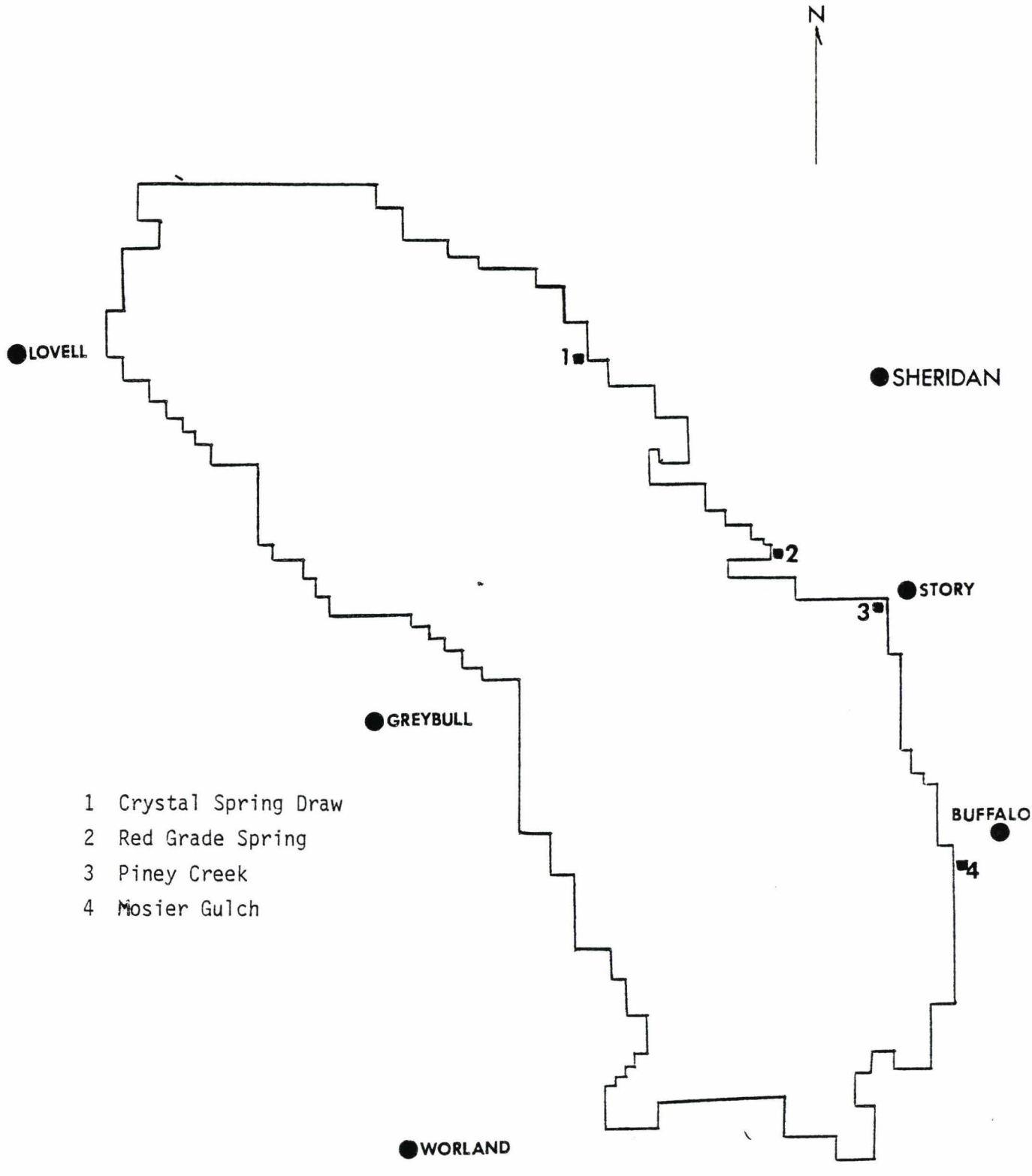

TABLE 1 1978 BIGHORN MOUNTAIN PINE BEETLE BROOD SURVEY SUMMARY

AREA	NUMBER OF TREES	NUMBER OF SAMPLES	AVERAGE DBH ± S. E.	TOTAL BROOD	AVERAGE BROOD ± S. E.	TOTAL STARTS	AVERAGE STARTS	TOTAL INCHES GALLERY	AVERAGE INCHES GALLERY ± S. E.	CLERIDS	MEDETERA	BA	ELEVATION	WOODPECKERING	POPULATION TREND
Tosier Gulch	10	20	10.32 ± .66	420	21.00 ± 2.73	58	2.90 ± .24	660	33.00 ± 3.28	2	14	120	6,000	None	Increasing
Piney Creek	12	24	13.86 ± .88	386	16.08 ± 2.84	38	1.58 ± .20	553	23.04 ± 1.82	0	27	140	6,000	Light	Increasing
Red Glade Spring	10	20	12.38 ± .84	350	17.50 ± 1.67	42	2.16 ± .22	581	29.05 ± 1.75	0	19	140	6,800	Light to moderate	Increasing
Crystal Spring Draw	10	20	10.41 ± .39	386	19.30 ± 2.14	53	2.65 ± .21	551	27.55 ± 1.60	0	10	125	6,700	Light	Increasing
TOTAL	42	84		1,542		191		2,345		2	70				
AVERAGE			11.84 ± .43		18.36 ± 1.22		2.27 ± .12		27.92 ± 1.01			131	-	Light	Increasing

PESTICIDE USE STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key -- out of the reach of children and animals -- and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U. S. Department of Agriculture, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.